

Suspect Sweetener

Arsenic Detected in Organic Brown Rice Syrup

Organic brown rice syrup (OBRS) is a sweetener frequently used as an alternative to high-fructose corn syrup in organic and health food products. In a study of children's foods, a team of researchers discovered high levels of arsenic in toddler formula products that contained OBRS. Given evidence that arsenic accumulates in rice at high levels, the researchers suspected OBRS was the source of the arsenic in the formulas—a suspicion corroborated by additional tests of several products both with and without the sweetener [*EHP* 120(5):623–626; Jackson et al].

The researchers tested 3 commercially available brown rice syrups, 29 cereal bars (18 with OBRS), 3 high-performance “energy shot blocks” with OBRS, 15 infant formulas without the sweetener, and 2 toddler formulas with it. The researchers measured inorganic arsenic as well as the organic chemical species dimethylarsenate (DMA) and monomethylarsenate (MMA), which are generally believed to be less toxic than inorganic arsenic.

The OBRS-sweetened toddler formulas (one soy-based, one milk-based) had about 20 times the total arsenic concentrations of the non-OBRS infant formulas. Samples of prepared

milk-based toddler formula had inorganic arsenic concentrations just below the current Environmental Protection Agency (EPA) drinking water standard of 10 µg/L, whereas inorganic arsenic in samples of soy-based toddler formula tested 1.5–2.5 times above the EPA standard.

In the brown rice syrups tested, inorganic arsenic made up 80–90% of the arsenic content of two of the syrups and half the arsenic content of the third. All three also contained DMA, with lesser amounts of MMA. All 29 cereal bars tested contained some arsenic, but those without any rice-based ingredients had the lowest levels. Nearly 60% of the others contained inorganic arsenic. The three energy shot blocks contained enough inorganic arsenic that if an individual were to consume the manufacturer-recommended four servings during a two-hour workout, they would ingest the equivalent of drinking a liter of water containing 10 µg/L arsenic; total arsenic would be twice that.

The two toddler formulas tested were the only ones the researchers could find that contained OBRS. However, they estimate that approximately half of all cereal and energy bars contain OBRS or other rice products, and they conclude that food containing OBRS may be a major pathway to arsenic exposure for some people. Although the health effects of low-level arsenic exposure over limited durations are unknown, childhood exposure may affect lifelong health and should be limited. The authors therefore urge U.S. regulators to establish limits for arsenic levels in food, particularly infant and toddler formulas.

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The two toddler formulas tested are the only ones known to be made with OBRS.

Landscape Fire Smoke as a Cause of Death

Burning Vegetation Estimated to Kill Hundreds of Thousands Worldwide

The smoke from burning forests, grasslands, agricultural areas, and peatlands contains hundreds of chemicals, and the adverse health effects of exposures to such smoke are becoming better documented. Now a team of Australian, Canadian, and U.S. researchers has calculated the first global estimate of premature deaths from all causes linked with this smoke [*EHP* 120(5):695–701; Johnston et al.].

Satellite and other data provided information on the areas burned each year over the period 1997–2006. The researchers first estimated daily and annual exposures to fine particulate matter (PM_{2.5}), which they used as a surrogate for the many toxic substances in landscape fire smoke, distinguishing between sporadic and chronic smoke exposure. Then they used data on the health effects of smoke-related PM_{2.5} to estimate how many deaths could be attributed to landscape fire smoke.

The estimated annual exposure to PM_{2.5} from landscape fire smoke ranged from 0 to 45 µg/m³. The region with the highest population-weighted annual average was sub-Saharan Africa, at 12.2 µg/m³.

Over the 10-year period, the researchers estimate landscape fire smoke killed an average 339,000 people per year, with a high percentage of deaths occurring in low-income areas. By comparison, urban air pollution kills an estimated 800,000 people per year worldwide, and indoor burning of solid fuels kills an estimated 1.6 million. Strong El Niño conditions appeared to contribute to more deaths, with an estimated 532,000 deaths during the 1997–1998 El Niño cycle (compared with 262,000 during the 1999–2000 La Niña cycle).

About 46% of the premature deaths were estimated to occur in sub-Saharan Africa, and 32% were estimated to occur in Southeast Asia, each of which is home to large numbers of intentional burns for agriculture, deforestation, and other purposes. Other high-smoke areas included southeastern Russia and certain parts of Central and South America.

The study provides more insights into adverse health impacts than were previously available, but the researchers acknowledge their methods have many limitations, including uncertainties in the models used, limited data on health effects caused by landscape fire smoke, incomplete data on baseline death rates in some areas of the world, and an inability to account for factors known to alter the composition of smoke. However, the authors say there likely is enough information now available to suggest that reducing intentional fires could save many lives.

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